

## A CASE OF INTERNAL HYDROCEPHALUS, DUE TO DISEASE (THROMBOTIC) IN THE WALL OF THE STRAIGHT SINUS.

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The causes of internal hydrocephalus, exclusive of the forms due to intra-ventricular inflammation and compression of the venous discharge by tumors, are little known. A case which would ordinarily be called idiopathic, but in which a sufficient cause was found, is therefore worth recording. It occurred in a six-year-old girl of German parentage. The first symptoms of the trouble began three months previously; these it is only necessary to state briefly. She had been apparently well until attacked by vomiting. This was followed by convulsive attacks and later by a variety of indefinite symptoms; opisthotonus in the convulsive seizures, pain across the forehead or in one or the other ear, general weakness, etc. No paralysis, no trouble with vision, intelligence clear to the last.

She died under the charge of Dr. Bender, with whom I made the autopsy and to whom I am indebted for the above notes.

The skull was thick and firm. Brain surface and envelopes healthy except as to the sinuses. No trace of meningitis on either base or convexity. On removing the brain, clear fluid broke through the posterior perforated space. The whole amount of fluid was estimated to have been 5-6 oz. The superficial gyri were but very moderately flattened. Examination of the ventricles showed the velum interpositum firm and rather thick. No adhesion or other sign of inflammation in the ventricles. Both lateral chambers, and the third and fourth ventricles with the connecting iter were dilated. The only noticeable alteration in their walls was the dilatation of the veins, especially in their finer branches. This was apparent on the ventricular roof as well as floor (most of the roof-veins discharge through the vena Galeni). The two *venæ cerebræ internæ* were very broad and contained liquid blood. No cause for the trouble then was discovered in the distended cavities. On examining the sinus rectus, a dark thickened spot immediately attracted attention. This was about half an inch from the anterior end. Starting from the torcular a director readily passed up the sinus until this point was reached where an obstruction was met. On slitting up the sinus, it was found that opposite the thickening an oblique thin membranous

septum had retarded the sound. After opening, it was not possible to say whether the membrane had completely closed the narrowed sinus, the sound having made an opening, or whether a fine slit through it had existed. Immediately adjoining this were several fine fibres crossing from wall to wall, but not like the bands so often seen in the various sinuses. The above-mentioned thickening in the sinus wall affected each side and was in the substance of the wall itself. On cutting through either side, a layer of reddish-gray organized material was found just in the position of the parasinoidal spaces which occur, in adults at least, even along the straight sinus. This deposit extended about a third of an inch, the remainder of the sinus being free. The longitudinal sinus showed a somewhat similar though less advanced condition. Its main channel was everywhere free, but the *sini subalterni* shone through full and black and to the feel presented firm cords. On opening these, a dark fibrinous material, partly organized, was found firmly attached to the surroundings. Here evidently a process had been going on, quite similar to that beside the straight sinus, but of a more recent date. Moreover, lying below the vessel's channel these thromboses did not materially contract it.

The apex of the right lung was adherent and very hyperæmic, though not presenting any discoverable tubercles.

We know from many cases of cerebellar tumor that compression of the venous discharge from the ventricles may cause internal hydrocephalus. In this case the obstruction developed in the main efferent vessel itself, and hence was not quite parallel, since certain anastomoses may have remained free. As I have elsewhere shown ("Veins of the Brain," 1884), the ventricular veins are terminal vessels, their only connection with other veins—except by the sinus rectus—being in their posterior portion just before uniting. Here certain basilar veins, usually discharging through the vena Galeni, communicate in a roundabout way with other cerebral veins. This limited anastomosis was doubtless but slightly interfered with, except secondarily by the increased pressure from the accumulating fluid.

No history of syphilitic taint or other cause for the peculiar thrombotic condition could be found.